

WHAT IS CLAIMED IS:

16/16
1. Apparatus for cooling a bundle of capillary tubes to prevent overheating of the tubes during a parallel capillary electrophoresis procedure, said apparatus comprising

5 a jacket of thermally conductive solid material comprising mating jacket members movable between an open position in which the jacket members are separated to allow placement of the bundle in the jacket and a closed position in which the jacket members are mated together and the 10 bundle is disposed inside the jacket in thermally conductive relation with the jacket, and

15 window openings in said mating jacket members defining a window to permit the passage of light through the window and the capillary tubes of the bundle at the location of the window.

2. Apparatus as set forth in claim 1 further comprising a cushion of thermally conductive, cushioning material inside the jacket and in thermally conductive relation with the jacket for cushioning the bundle when the 5 jacket members are in said closed position.

3. Apparatus as set forth in claim 2 further comprising fasteners for drawing the mating jacket members together and causing the cushion inside the jacket members to press against said bundle.

4. Apparatus as set forth in claim 1 wherein said jacket is of an electrically insulating material.

5. Apparatus as set forth in claim 4 wherein said jacket is of a ceramic-like material having a thermal

conductivity in the range of about 5-50 W/m-K, and a dielectric strength in the range of about 20-400 kV/mm.

6. Apparatus as set forth in claim 5 wherein said jacket is of boron nitride.

7. Apparatus as set forth in claim 5 wherein said jacket members comprise a pair of opposing slabs, each slab having a generally channel shape and defining a recess therein.

8. Apparatus as set forth in claim 7 further comprising a cushion of thermally conductive, cushioning material disposed inside the recesses of said slabs for cushioning the bundle when the jacket members are in said 5 closed position.

9. Apparatus as set forth in claim 8 wherein said cushion has a thermal conductivity in the range of about 3-9 W/m-K.

10. Apparatus as set forth in claim 8 further comprising fasteners for drawing the mating jacket members together and causing the cushion inside the jacket members to press against said bundle.

11. Apparatus as set forth in claim 1 wherein said jacket members have opposing surfaces coated with an electrically insulating material.

12. Apparatus as set forth in claim 1 wherein said jacket is an inner jacket and said apparatus further comprises an outer metal jacket around the inner jacket and in thermally conductive relation therewith.

13. Apparatus as set forth in claim 12 wherein said outer jacket comprises mating outer jacket members movable

between an open position in which the outer jacket members are separated and a closed position in which the outer jacket members are mated together around the inner jacket.

14. Apparatus as set forth in claim 12 wherein said inner and outer jackets are elongate for covering a major portion of the length of the bundle and have approximately equal lengths, and wherein said outer jacket members have 5 window openings therein aligned with the window openings in the inner jacket when the jackets are closed.

15. Apparatus as set forth in claim 14 wherein said outer jacket members have recesses therein for receiving respective inner jacket members.

16. Apparatus as set forth in claim 12 further comprising a heat sink on at least one of said mating outer jacket members.

17. A combination of the apparatus set forth in claim 12 and a bundle of capillary tubes inside the inner and outer jackets, said jackets extending over at least 50 % of the overall length of the capillary bundle.

18. A combination of the apparatus set forth in claim 1 and a bundle of capillary tubes inside the jacket, said jacket extending over at least 50% of the overall length of the capillary bundle.

19. Apparatus for cooling a bundle of capillary tubes to prevent overheating of the tubes during a parallel capillary electrophoresis procedure, said apparatus comprising

5 an inner jacket of thermally conductive, electrically insulating solid material comprising mating inner jacket members movable between an open position in which the jacket

members are separated to allow placement of the bundle in the jacket and a closed position in which the jacket members 10 are mated together and the bundle is disposed inside the inner jacket in thermally conductive relation with the jacket,

an outer jacket of thermally conductive solid material comprising mating outer jacket members movable between an 15 open position in which the jacket members are separated and a closed position in which the jacket members are mated together around the inner jacket and in thermally conductive relation therewith,

a cushion of thermally conductive, cushioning material 20 disposed inside the inner jacket for cushioning the bundle when the inner and outer jacket members are in said closed position, and

a window through said mating inner and outer jacket members for permitting the passage of light through the 25 window and the tubes of the bundle at the location of the window.

20. Apparatus as set forth in claim 19 wherein said inner jacket is of a ceramic-like material having a thermal conductivity in the range of about 5-50 W/m-K and a dielectric strength in the range of about 20-400 kV/mm.

21. Apparatus as set forth in claim 20 wherein said inner jacket is of boro nitride.

22. Apparatus as set forth in claim 19 wherein said inner jacket comprises a pair of opposing channel-shaped slabs defining recesses for receiving said cushion therein.

23. Apparatus as set forth in claim 19 further comprising fasteners for drawing the mating outer and inner

10 20 30 40 50 60 70 80 90

jacket members together and causing the cushion inside the inner jacket members to press against said bundle.

24. Apparatus as set forth in claim 19 wherein said inner and outer jackets are elongate for covering a major portion of the length of the bundle and have approximately equal lengths.

25. Apparatus as set forth in claim 19 further comprising a heat sink on at least one of said mating outer jacket members.

26. A combination of the apparatus set forth in claim 19 and a bundle of capillary tubes inside the inner and outer jackets, said jackets extending over at least 50% of the overall length of the capillary bundle.

27. A method of cooling a bundle of capillary tubes to prevent overheating of the tubes during a parallel capillary electrophoresis procedure, said method comprising

positioning a longitudinal section of the bundle in an
5 open cooling jacket of electrically insulating, thermally
conductive solid material,

arranging the tubes of said longitudinal section so
that they extend generally parallel and in side-by- side
relation to one another in a generally planar array in the
10 jacket,

closing the jacket to enclose within the jacket said
longitudinal section of the bundle from one end of the
section to the other, said tubes of the longitudinal section
being in thermal conductive relation with the jacket,

15 initiating a capillary electrophoresis procedure
resulting in the generation of heat within the tubes of the

bundle, said jacket functioning to cool said longitudinal section of the bundle to prevent overheating of the bundle.

28. A method as set forth in claim 27 further comprising sizing the jacket so that it has a length of at least 50% of the overall length of the bundle.

29. A method as set forth in claim 27 wherein said jacket is an inner jacket of electrically insulating material, and said method further comprises placing an outer jacket of thermally conductive material around said inner jacket to conduct heat away from said inner jacket.

30. A method as set forth in claim 29 further comprising sizing the inner and outer jackets so that each has a length of at least 50% of the overall length of the bundle.

00000000000000000000000000000000